

## CLAIMS

1. A printer for performing correction to improve the quality of images represented by input binary black and for printing the images,

5 comprising an image-quality corrector unit for detecting second irregular patterns that are represented by data included in the input black and white pixel data and that are specific to an error-variance method, wherein said image-quality

10 corrector unit detects at least one type of substantially vertical vertical-line irregular patterns, substantially horizontal horizontal-line irregular patterns, and thin-line patchy patterns to thereby smooth the detected second irregular

15 patterns.

2. The printer according to claim 1, wherein said image-quality corrector unit sequentially inputs the black and white pixel data representing groups of an attention pixel and a plurality of peripheral pixels, and compares the input data to the irregular patterns registered; and when pattern-matching is detected, said image-quality corrector unit performs area gradation correction for converting an area at a predetermined position 20 in an n-divisional pixel (n = natural number) of the attention pixel and a predetermined number of intrapixel divisional areas to black areas.

3. A printer for performing correction to improve the quality of images represented by input binary black and for printing the images, comprising an image-quality corrector unit for 5 detecting isolated pixels that are specific to error-variance method and that are represented by data included in the input black and white pixel data and for distributing the detected isolated pixel to peripheral pixels to thereby reduce the 10 pixel size.

4. The printer according to claim 3, wherein  
said image-quality corrector unit comprises a  
plurality of matrix patterns having different sizes,  
uses the matrix patterns in the order of larger  
15 sizes to detect isolated pixels, and distributes  
the isolated pixels to peripheral pixels according  
to the sizes of the matrix patterns used to detect  
the isolated pixels.

5. The printer according to claim 4, wherein  
20 said image-quality corrector unit allows the number  
of distributed peripheral pixels to be increased in  
proportion to the increase in the size of the  
matrix pattern used to detect an isolated pixel,  
and concurrently, allows the size of a reduced  
25 distribution pixel to be reduced in inverse  
proportion thereto.

6. The printer according to claim 3, wherein

5        said image-quality corrector unit uniformly distributes reduced pixels obtained through reduction in the size of the detected isolated pixel to peripheral pixels in a plurality of directions.

7. A printer for performing correction to improve the quality of images represented by input binary black and for printing the images, comprising:

10        a first image-quality corrector unit for detecting first irregular patterns that are represented by data included in the black and white pixel data and that are specific to binary processing (binary coding) according to a method 15        other than an error-variance method to thereby smooth the detected first irregular patterns;

15        a second image-quality corrector unit for detecting second irregular patterns that are represented by data included in the input black and 20        white pixel data and that are specific to an error-variance method, wherein said image-quality corrector unit detects at least one type of substantially vertical vertical-line irregular patterns, substantially horizontal horizontal-line 25        irregular patterns, and thin-line patchy patterns to thereby smooth the detected second irregular patterns; and

TOP SECRET - DEFENSE 260

a controller unit for operating such that the black and white pixel data input to said first image-quality corrector unit is input to said second image-quality corrector unit to be processed thereby when the black and white pixel data does not match one of the first irregularity detection patterns, and said first image-quality corrector unit is used to process the input black and white pixel data by interrupting processing being performed by said second image-quality corrector unit when the black and white pixel data matches one of the first irregularity detection patterns.

8. The printer according to claim 7, wherein said first image-quality corrector unit and said second image-quality corrector unit sequentially input the black and white pixel data representing groups of an attention pixel and a plurality of peripheral pixels, and compares the input data to the first irregular patterns and the second irregularity detection patterns; and when pattern-matching is detected, said first image-quality corrector unit and said second image-quality corrector unit perform area gradation correction for converting an area at a predetermined position in an n-divisional pixel (n = natural number) of the attention pixel and a predetermined number of intrapixel divisional areas to black areas.

ପାତ୍ରବିଦ୍ୟା

9. The printer according to claim 7, further comprising a third image-quality corrector unit for detecting isolated pixels that are specific to the error-variance method and that are represented by  
5 data included in the input black and white pixel data and for distributing the detected isolated pixel to peripheral pixels to thereby reduce the pixel size.

10. The printer according to claim 7,  
10 wherein said first image-quality corrector unit comprises a plurality of matrix patterns having different sizes, uses the matrix patterns in the order of larger sizes to detect isolated pixels, and distributes the isolated pixels to peripheral  
15 pixels according to the sizes of the matrix patterns used to detect the isolated pixels.

11. The printer according to claim 10,  
wherein said first image-quality corrector unit allows the number of distributed peripheral pixels  
20 to be increased in proportion to the increase in the size of the matrix pattern used to detect an isolated pixel, and concurrently, allows the size of a reduced distribution pixel to be reduced in inverse proportion thereto.

25 12. The printer as according to claim 7,  
wherein said image-quality corrector unit uniformly distributes reduced pixels obtained through

1024778 02954869

reduction in the size of the detected isolated pixel to peripheral pixels in a plurality of directions.

13. The printer according to claim 7,  
5 wherein said controller unit operates such that the black and white pixel data input to said first image-quality corrector unit is input to said second image-quality corrector unit and subsequently to said third image-quality corrector  
10 unit to be processed thereby when the black and white pixel data does not match one of the first irregularity detection patterns, and said first image-quality corrector unit is used to process the input black and white pixel data by interrupting  
15 processing being performed by said second image-quality corrector unit and processing being processed by said third image-quality corrector unit when the black and white pixel data matches one of the first irregularity detection patterns.

20 14. A printer for performing correction to improve the quality of images represented by input binary black and for printing the images, comprising:

25 a first image-quality corrector unit for detecting first irregular patterns that are represented by data included in the black and white pixel data and that are specific to a method other

00000000000000000000000000000000

than an error-variance method to thereby smooth the detected first irregular patterns;

5 a third image-quality corrector unit for  
detecting isolated pixels that are represented by  
data included in the input black and white pixel  
data and for distributing the detected isolated  
pixel to peripheral pixels to thereby reduce the  
pixel size; and

10 a controller unit for operating such that the  
black and white pixel data input to said first  
image-quality corrector unit is input to said third  
image-quality corrector unit to be processed  
thereby when the black and white pixel data does  
not match one of the first irregularity detection  
15 patterns, and said first image-quality corrector  
unit is used to process the input black and white  
pixel data by interrupting processing being  
performed by said third image-quality corrector  
unit when the black and white pixel data matches  
20 one of the first irregularity detection patterns.

15. A printing method for performing  
correction to improve the quality of images  
represented by input binary black and for printing  
the images, wherein detection is performed for  
25 second irregular patterns that are represented by  
data included in the input black and white pixel  
data and that are specific to an error-variance

method such that detection is performed for at least one type of substantially vertical vertical-line irregular patterns, substantially horizontal horizontal-line irregular patterns, and thin-line 5 patchy patterns to thereby smooth the detected second irregular patterns.

16. A printing method for performing correction to improve the quality of images represented by input binary black and for printing 10 the images, wherein detection is performed for isolated pixels that are specific to error-variance method and that are represented by data included in the input black and white pixel data and for distributing the detected isolated pixel to 15 peripheral pixels to thereby reduce the pixel size.

17. A printing method for performing correction to improve the quality of images represented by input binary black and for printing the images, comprising:

20 a first image-quality correction step for detecting first irregular patterns that are represented by data included in the black and white pixel data and that are specific to binary processing (binary coding) according to a method 25 other than an error-variance method to thereby smooth the detected first irregular patterns;

a second image-quality correction step for

detecting second irregular patterns that are represented by data included in the input black and white pixel data and that are specific to an error-variance method, wherein said image-quality

5 correction step detects at least one type of substantially vertical vertical-line irregular patterns, substantially horizontal horizontal-line irregular patterns, and thin-line patchy patterns to thereby smooth the detected second irregular

10 patterns; and

a control step for operating such that the black and white pixel data input to said first image-quality correction step is input to said second image-quality correction step to be

15 processed thereby when the black and white pixel data does not match one of the first irregularity detection patterns, and said first image-quality correction step is used to process the input black and white pixel data by interrupting processing

20 being performed in said second image-quality correction step when the black and white pixel data matches one of the first irregularity detection patterns.

18. A printing method for performing  
25 correction to improve the quality of images represented by input binary black and for printing the images, comprising:

DOCUMENT NUMBER

a first image-quality correction step for detecting first irregular patterns that are represented by data included in the black and white pixel data and that are specific to a method other than an error-variance method to thereby smooth the detected first irregular patterns;

a second image-quality correction step for detecting second irregular patterns that are represented by data included in the input black and white pixel data and that are specific to an error-variance method, wherein said image-quality correction step detects at least one type of substantially vertical vertical-line irregular patterns, substantially horizontal horizontal-line irregular patterns, and thin-line patchy patterns to thereby smooth the detected second irregular patterns:

20 a third image-quality correction step for  
detecting isolated pixels that are represented by  
data included in the input black and white pixel  
data and for distributing the detected isolated  
pixel to peripheral pixels to thereby reduce the  
pixel size; and

a control step for operating such that the  
25 black and white pixel data input to said first  
image-quality correction step is input to said  
third image-quality correction step to be processed

therein when the black and white pixel data does not match one of the first irregularity detection patterns, and said first image-quality correction step is used to process the input black and white 5 pixel data by interrupting processing being performed in said second image-quality correction step and said third image-quality correction step when the black and white pixel data matches one of the first irregularity detection patterns.

10 19. A printing method for performing correction to improve the quality of images represented by input binary black and for printing the images, comprising:

an image-quality correction step for 15 detecting irregular patterns that are represented by data included in the black and white pixel data and that are specific to a method other than an error-variance method to thereby smooth the detected irregular patterns;

20 a pixel-distribution step for detecting isolated pixels that are represented by data included in the input black and white pixel data and for distributing the detected isolated pixel to peripheral pixels to thereby reduce the pixel size;

25 and

a control step for operating such that the black and white pixel data input to said image-

quality correction step is input to said pixel-distribution step to be processed therein when the black and white pixel data does not match one of the first irregularity detection patterns, and said

5 image-quality correction step is used to process the input black and white pixel data by interrupting processing being performed in said pixel-distribution step when the black and white pixel data matches one of the first irregularity

10 detection patterns.

20. A printer for performing correction to improve the quality of images represented by input binary black and for printing the images, comprising:

15 a scale-varying processor unit for varying the size of an original image optically scanned to a predetermined image size by performing pixel-removal processing;

20 a binary unit for converting the size-varied image into black and white pixel data according to an error-variance method; and

25 an image-quality corrector unit for detecting irregular patterns that are represented by data included in the black and white pixel data and that are specific to an error-variance method, wherein said image-quality corrector unit detects at least one type of substantially vertical vertical-line

COPYRIGHTED MATERIAL

irregular patterns caused through the pixel-removal processing, substantially vertical vertical-edge irregular patterns, substantially horizontal horizontal-line irregular patterns, substantially horizontal horizontal-edge irregular patterns; and thin-line patchy patterns to thereby smooth the detected patterns. to thereby smooth the detected patterns.

21. The printer according to claim 20,  
10 wherein said scale-varying processor unit magnifies  
the size of the original image to a predetermined  
image size according to pixel-interpolation, and  
then reduces the magnified image size to the  
predetermined image size by performing the pixel-  
15 removal processing.

22. The printer according to claim 20,  
wherein said scale-varying processor unit detects a  
gradient variation of a pixel-removal-candidate  
attention pixel with respect to peripheral pixels,  
20 does not perform pixel-removal processing when the  
gradient variation is relatively great, and  
performs pixel-removal processing when the gradient  
variations are relatively small.

23. The printer according to claim 20,  
25 wherein said scale-varying processor unit defines a  
matrix having a predetermined size for a pixel-  
removal-candidate attention pixel, calculates the

sum of absolute values representing the difference between the pixel-removal-candidate attention pixel and peripheral pixels belonging to the matrix as a gradient variation amount, does not perform the

5 pixel-removal processing when the gradient variation amount is equal to or greater than a predetermined threshold, and performs pixel-removal processing when the gradient variation amount is less than the threshold.

10 24. The printer according to claim 20,  
wherein said scale-varying processor unit does not  
perform remove a removal-candidate pixel either  
when the level of the removal-candidate pixel is  
bright, and the overall tone of peripheral pixels  
15 thereof is dark; or when the level of the removal-  
candidate pixel is dark, and the overall tone of  
peripheral pixels thereof is bright.

25. The printer according to claim 20,  
wherein said image-quality corrector unit inputs  
20 the black and white pixel data representing groups  
of an attention pixel and a plurality of peripheral  
pixels, and performs comparison of the input data  
to the irregular patterns registered; and when  
pattern-matching is detected, said image-quality  
25 corrector unit performs area gradation correction  
for converting an area at a predetermined position  
in an n-divisional pixel (n = natural number) of

Digitized by srujanika@gmail.com

the attention pixel and a predetermined number of intrapixel divisional areas to black areas.